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ABSTRACT

This research paper sought to determine whether smaller sized schools decrease student alienation and increase program diversity both within the school and compared to others. Hypotheses tested were: (1) participation in small work units positively affects teacher task interdependence resulting in greater teacher interaction; (2) teacher interdependence results in increased differentiation among students and decreased routinization of student assignments; (3) differentiation and routinization affect student perceptions of their classroom environment. The data base was obtained through the administration of a teacher survey and a student questionnaire to participants in the Alum Rock Voucher Demonstration, in which participating schools are organized into smaller educational "mini-schools." The data is analyzed and discussion presented concerning each area of investigation. Conclusions presented are that: (1) teacher interaction, while more prevalent in smaller work groups, is more a function of task structure than of work unit size; (2) classroom organization is also affected more by the complexity of the task structure than the unit size; and (3) students seemed to enjoy class more when they are part of a smaller educational unit, though the benefits of small groups do not flow directly from class size but from a chain of causation in which small groups foster a more complex task structure, resulting in greater teacher interaction, differentiation, and less student routinization. (MB)

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THE EFFECT OF SCHOOL AND TASK STRUCTURE ON TEACHER INTERACTION, CLASSROOM ORGANIZATION AND STUDENT AFFECTS*

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THE EFFECTS OF SCHOOL AND TASK STRUCTURE ON TEACHER INTERACTION, CLASSROOM ORGANIZATION AND STUDENT AFFECT

One of the current "reforms" suggested for the improvement of education is the creation of smaller schools, ostensibly to decrease student alienation and increase the amount of program diversity both within and among schools (Coleman, 1974; Martin, 1974; Brown, 1973). To date little research has actually been undertaken to determine whether smaller sized schools do in fact provide the positive educational benefits ascribed to them. Some information can be gleaned from the results of the Alum Rock Voucher Demonstration in which participating schools were reorganized into new, smaller educational units called "mini-schools". Although the voucher demonstration included novel features other than the creation of mini-schools (e.g. creation of parent choice and a quasi-market system)[1], the fact that teachers organized themselves into different-sized work units offering various kinds of educational programs provides an excellent opportunity in which to assess whether and in what ways the size of these mini-schools affected how teachers organized and managed instruction.

For more about the voucher demonstration, see Daniel Weiler et. al., A Public School Voucher Demonstration: The First Year at Alum Rock. Santa Monica, California, The Rand Corporation, 1974.

The Historical Context

The Office of Economic Opportunity gave the Alum Rock Union School District a five year grant in 1972 to test the feasibility of creating an "educational market" by establishing a Voucher Demonstration Project. With the dismantling of OEO, the Voucher Project was transferred to the National Institute of Education which assumed the responsibility for monitoring both the demonstration and its attendant evaluation.

The first year of the grant, five elementary schools and one middle school in the Alum Rock District volunteered to participate in the Demonstration. By year two, five more elementary schools and two more middle schools joined the demonstration. A stipulation for participating was that each school had to divide into two or more smaller-sized decision making units ("mini-schools") which were to offer different types of programs. There were 22 mini-schools during the first year of the demonstration, 45 during the second year and 51 during the third year of the experiment from which parents could choose an educational program for their children. The variety of programs offered was extensive; there were programs which focused on basic skills, on specific academic subjects (math-science), on specific curricular materials (BRL, SRA), on general skills (interpersonal skills, problems solving) and on bilingual or multi-ethnic approaches. Alternatively, parents could send their children to the elementary or middle "nonvoucher" schools which opted not to participate in the demonstration.

The mini-schools which were created were also of varying sizes. As of 1974-75 there were 17 small (two to four teachers), 20 medium (five to seven teachers), and 14 large (eight to twenty-one teachers) mini-schools in Alum Rock. Every participating school had mini-schools of different sizes.

Simultaneously with the creation of mini-schools, decision-making was decentralized from the district to the mini-school. Teachers became responsible for making budgetary, curricular, and general policy decisions for their mini-schools, with one teacher coordinating activities and assuming the role of mini-school representative.

UNDERLYING THEORY AND GUIDING HYPOTHESES

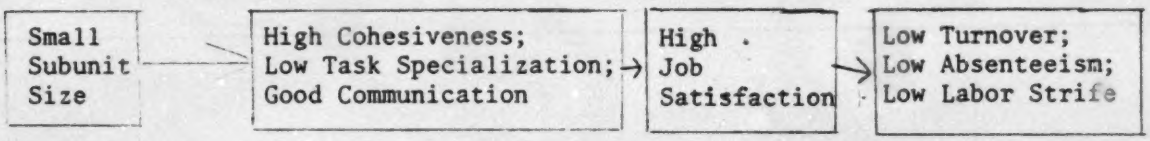
There is no complete theory relating school structural change and the attend nt intervening variables to student feelings about their classroom environment. This study attempts cautiously and somewhat heroically to investigate the black box mediating input and output. To this end it examines the effect of school and task structure on teacher interaction, classroom organization and student affect. The underlying theory is generated from the bits and pieces of evidence in various kinds of studies which when integrated form a tenuous whole.

Structural Variables

The initial aim of this study was to determine how a major organizational intervention such as the voucher demonstration project would affect teacher task structure and the other variables under investigation in both voucher and non voucher schools. Preliminary analysis indicated, however, that such an assessment was confounded by the high corrolation between school size and the variable school type (nonvoucher/voucher) ($r = .86$). When teachers in Alum Rock were asked about school size voucher teachers were asked about the size of their mini-school and non-voucher teachers asked about the size of their total school. Since what is meant by school size is easier to operationalize than what is meant by "voucher", the decision was made to use school size as the major structural variable under investigation.

Size. There is ample support in the literature about the effect of work group size on member interaction and satisfaction. The research literature on small groups indicates that members interact and participate more frequently and more equally in groups that are small (Kelly and Thibaut, 1954; Bales and Borgatta, 1955; Taylor and Faust, 1952). It has also been found that smaller groups are subject to more intense peer pressure and therefore exhibit greater intragroup homogeneity of attitudes and behavior (Betz, 1972). They are also marked by greater group cohesiveness and more frequent amicability among individual group members (katz, 1949; Larson, 1949). Members also tend to be less specialized and conceive their roles more broadly - that is, they tend to function in a wider range of activities - in small group contexts (Barker and Barker, 1961a, 1961b; Thomas, 1959; Wright, 1961).

Whereas small group research has shown group size is related to member satisfaction and attitudes, research on organizational behavior suggests that group size may affect these outcomes only indirectly. According to this perspective, organizational size affects member participation and satisfaction by setting limits on communication, control, role specialization, and coordination processes (Indik, 1965). It is these factors, then, which are presumed to directly structure the quality of interpersonal relationships within the organization. Porter et. al. (1965) reviewed seventeen studies relating subunit size to a number of outcome variables and found that a relationship favoring small subunit size was found in 6 of 7 job satisfaction studies, 9 of 12 absenteeism studies, 3 of 4 turnover studies, 2 of 2 labor dispute studies, 3 of 6 accident studies, and 3 of 8 productivity studies, The authors presented the following explanatory model for the effects of organization subunit size on these variables:


Small Subunit Size
High Cohesiveness; Low Task Specialization; Good Communication
High Job Satisfaction
Low Turnover; Low Absenteeism; Low Labor Strife

Support for the indirect effect of group size on member satisfaction is also found in the literature on team teaching. Bredo (1975), in his investigation of collaborative relationships on teaching teams, found that although communication and interdependence among teachers were greater in smaller teams, it was these intervening variables rather than group size which directly affected teacher morale. Similarly, in her study of

voucher teachers in Alum Rock, Abramowitz (1975) found that size is an important indirect structural source of differences since it results directly in increased interaction which in turn results in group cohesiveness and programmatic coherence.

Teacher Task Interdependence. The literature suggests that smaller work groups result in more interaction and cohesiveness. The question arises as to whether task structure affects the communication in different sized work environments. Because the kinds of relationships that exist between faculty and administrators and among the staff vary depending on the nature of the task, this study focuses solely on relationships centering around instruction. Basically it attempts to determine the degree to which teachers directly interact with each other in the process of providing an educational program. For example, teachers may behave autonomously and independently, similar to the traditional elementary school teacher who has little contact with other teachers in the school or with different sets of students. Or teachers might relate to each other sequentially by sending one group of students to another teacher (cross-grading). In this case, although teachers "share" students, contact among teachers centering around instruction is usually limited. A third variant is the situation in which teachers enjoy a recipical arrangement with each other by teaching the same group of students together.

Reciprocal task interdependence is assumed to be a more complex technology than exchanging students by cross-grading. In the former case teachers collaborate about and share in actual classroom instruction, whereas in the latter instance their direct instructional interaction would be quite

originated groups in several schools where the choice was not left up to the teachers. Regardless of possible selection effects, the literature on team teaching suggests that working closely together is a novel experience for teachers and the resultant work arrangements necessitiate considerable adjustment on the part of all involved (Bredo, 1975).

Third, this study suffers from the limitations of any cross-sectional analysis: the data were gathered at the end of several years of ongoing activity and therefore do not measure a causal process. The fact remains, however, that by year three of the demonstration, most administrators, teachers, and schools were fairly well acclimatized to the project. Given the lack of longitudinal data, the snapshot taken at the end of year three provides the only available look at the relationships among teachers which developed over this time period and the way in which teachers organized their work environment.

MEASURES

Exogenous Variables

Principal Support: Teachers were asked how helpful principals were in each of the following instances*:

a. providing teachers with released time for educational activities
b. providing teachers with suggestions about instruction
c. supporting special programs you may want to undertake
d. supporting you in your relations with parents and the community

* response options (1) no help to (5) a lot of help

Methodological Limitations

In undertaking the analysis which follows there are certain limitations which must be kept in mind. School size as a variable could be construed as a dependent rather than as an independent variable. For example, a program that draws a lot of students because of its attractiveness and success will be larger than its competitors. While this was the hope at the inception of the experiment, in actuality mini-school staff increased or decreased in size only slightly during the demonstration. This was due in large part to the fact that teachers decided a priori during the planning process on the size of the work group they thought would be best for themselves and the program they wanted to offer. Although there was competition among mini-schools, teachers were less concerned with making their program as large as possible than with minimizing staffing uncertainities resulting from student choice. Given the fact that there were so many safeguards to faculty positions (a prerequisite for faculty participation) the market forces envisioned at the onset of the demonstration did not operate as strongly as the initiators of the project might have hoped. It seems reasonable then to use "size" as an independent variable.

This brings up a second point. It is quite possible that teachers who volunteered to work together in smaller groups already knew and liked one another, and wished to interact and coordinate their activities. If so, a self selection factor might explain several of the relationships under investigation. It is true that many of the teachers participating in the demonstration did select with whom they wanted to work. But in many schools these choices did not result in the full complement of necessary staff. Whereas many principals added teachers to preformed groups, they also

DATA BASE

The data base consists of the results from two surveys: a teacher survey administered in March 1975 (Winter 1975 Teacher Survey) and a student questionnaire (Classroom Environment Inventory (CEI)). The teacher sample contains 26 second grade teachers, 29 third, 22 fourth and 35 fifth grade teachers. In addition 13 teachers report teaching a mixed fourth/fifth grade; 7 a third/fourth/fifth; 9 a third/fourth grade. The teacher survey inquired about teacher's classroom practices. Teachers were asked to describe such things as grouping practices, use of aides, the amount of time they spend teaching different subjects and the curriculum materials they used. This sample contains 9 non-voucher schools representing 47 teachers and 10 voucher schools representing 28 mini-schools and 94 teachers. The CEI was administered only to a subsample of classrooms in the main sample. The CEI asked students a series of true-false questions about such dimensions of their classroom environment as friction, organization, their feelings about the teacher and their self esteem. Since student data is available for only half the teachers, this subsample was not used for the main body of the analysis. Rather the analysis was replicated using the smaller sample containing the student data.

The smaller sample with matching student and teacher data contains twenty-five teachers in 8 nonvoucher schools and fifty-one teachers from 10 voucher schools and a total of twenty-two mini-schools. Forty-one of the teachers or 55 percent were in programs having from three to nine teachers; twenty-five or 45 percent were in schools containing ten to thirty-four teachers. The distribution by grade for voucher and nonvoucher teachers is in table 1.

Although increased differentiation and decreased routinization might result in greater student affinity for the class and/or teacher, it is quite possible for students to perceive such arrangements as being less organized for two reasons. First, students usually have expectations about the way school should be and if teacher management differs from these expectations students may judge the class poorly. Alternatively, it requires more skill to run classrooms such as these. Collaborative relationships, such as team teaching, may result in unintended classroom management problems.

Admittedly, this is a precarious field to enter, especially when learning environment is measured with a student survey. As Kirk aptly notes, researchers more frequently construct classroom environment inventories than use them to measure how proposed alterations in classroom affect students (Kirk, in Walberg, 1974). Furthermore, elementary school children are considered less reliable takers of such "tests" than older children. Because of such methodological problems, this part of the study is considered highly exploratory.

Summary

In sum then the propositions to be tested are threefold:

- o Participation in small as opposed to large work units positively affects teacher task interdependence.
- o Teacher task interdpendence results in increased differentiation among students and decreased routinization of student assignments, net of group size.
- o Differentiation and routinization affect student perceptions of their classroom environment, independent of size and task interdependence.

membership in group changes. The third dimension of classroom practice has to do with the evaluation structure, the indicator of which is the frequency with which tests are administered.

We would expect joint teaching, a more complex task structure than cross-grading, to result in a more complex classroom management system: greater differentiation of students, less routinization and more frequent evaluation.

Student Perceptions of Their Classroom

There is some sociological literature suggesting a relationship between the nature of the learning task and student involvement in learning (Bossert, 1975; Slavin, 1975). For example Bossert has found that the structure of the task activity i.e. whether it is a whole class activity like lecture or a multi-task activity in which students work in small groups on a variety of tasks, determines to a large extent the degree of control a teacher needs to run a class. Whereas recitation or lecture require greater teacher control and result in greater ritualization of activities and social distanc ing of the teacher, a multi-task oriented classroom leads more often to a greater degree of student and teacher involvement in class activity and facilitates the teacher's use of personal authority. If this is the case, the proposition suggests itself that teachers high on order and who run highly routinized classrooms are likely to have students who feel less positively about their class.

Classroom Structure. In their investigation of the relationship between staffing patterns and instructional practices, Cohen and Bredo (1974) found that as the complexity of teacher work arrangements increases so too does the complexity of classroom practices. In addition they found that teachers who work together in a relatively rigid division of labor were likely to have routinized aspects of their tasks more fully than those working together who assumed more flexible roles. Thus teachers involved in crossgrading (a rigid division of labor) were more likely to run routinized classrooms in which student group membership change was infrequent and autonomy low. On the other hand, work arrrangements in which teachers enjoyed a more collaborative relationship through teaming resulted in frequent group membership change and high student autonomy.

This study also examines the relationships between teacher task arrangements and classroom structure by looking at differentiation, routinization and evaluation. Differentiation refers to the degree to which students are treated differently or alike in terms of instruction and assignment. At one end of the continuum, each student may be treated individually and differently, while at the other end students might be treated uniformly The indicator of differentiation used in this study is the frequency of ability grouping.

A second dimension of classroom structure is routinization, or the degree to which students are allocated assignments on a routine or programmed basis. The indicator of routinization is the frequency with which

limited since they are merely exchanging students. Joint teaching, then, is expected to require organizational support and result in greater degree of teacher interaction. If this is so we would expect teachers who joint teach - to report interacting with each other more concerning educational matters than teachers who cross-grade.

Principal Support and Teacher Attitudes. In addition to the two structural variables outlined above the effects of two other exogenous variables are being studied - principal support and teacher attitudes - since both are likely to affect the teaching task structure.

Principal support for new educational techniques and work arrangements may encourage teachers to engage in more complex instructional activities. In fact teacher task interdependence often requires organizational support to be successful. It is unreasonable to expect teachers to teach courses together when the administration schedules teachers to work in unitary situations.

Similarly with teacher attitudes about classroom management. Teachers who share an educational philosophy are much more likely to be able to work together. Also teachers who believe that a classroom should be run with students subject to a great deal of order are less likely to experiment with peers who may want to run the classroom more flexibly.

e. encouraging teacher autonomy

f. encouraging educational innovations

g. providing leadership for the school as a whole

Due to the high intercorrolation of the above items with each other, (See Table 2) the Principal Support scale was constructed using the normalized values of each variable.

(Insert Table 2 about here)

Teacher Attitudes About Classroom Order: Teachers were asked whether they agreed or disagreed with a series of statements about classroom organization and management. A principal components analysis was undertaken and the following four questions emerged as the strongest corrolates with the major factor :

- o children should have assigned seats and places for at least part of the class day
- o children work best when the classroom is quiet
- o children should seldom be allowed to leave a task without completing it
- o during class hours, there should be more communication between the children and the teacher than among the children

The above items were normalized and combined into the ORDER scale measuring teacher attitudes about order in the classroom. Teachers who rank high in this scale seem to prefer quiet, orderliness, task centeredness and control.

Structural Variables

Size. Teachers in voucher schools were asked how many teachers there were in their mini-school and nonvoucher teachers were asked how many teachers were in their schools. Sixty teachers taught in schools containing from two to eight teachers; fifty-one were in schools having from nine to thirty five teachers (thirty teachers left the question blank). Table 3 illustrates the distribution of teachers in voucher and nonvoucher schools by size.

(Insert Table 3 about here)

Teacher Task Interdependence. Teacher task interdependence was measured by asking teachers how frequently they participated in joint teaching activities in reading, math, other academic subjects, and in nonacademic subjects* and whether or not they cross-graded i.e. taught any subject to another teacher's students.**

The correlations in Table 4 indicate that if teachers joint teach in math they are also likely to joint teach in reading (r = .49) and other academic subjects (r = .37). Although three out of four of the correlations were significantly related, it was felt that the joint teaching of academic subjects and the joint teaching of nonacademic subjects would probably have different implications for classroom organization. Therefore, two normalized scales were constructed to represent joint teaching in academic (JTAC) and non-academic subjects respectively.

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* response alternatives were 1) two or more times a year 2) once a month 3) about once a week 4) more than once a week 5) daily 6) several times a day.

** crossgrading: 1) no 2) yes

The split between the two scales is indicative of the fact that joint teaching in the academic subjects is less frequent than in the non-academic subjects as table 5 indicates. Cross-grading is a much more frequent occurance with 38 percent of the teachers reporting that they exchange students with another teacher.

(Insert Tables 4 and 5 about here)

Teacher Interaction

Teacher interaction was measured with two sets of variables: discussion of educational activities and discussion about non-classroom activities. To ascertain the former teachers were asked "how frequently do you discuss educational matters (techniques, general issues, etc.) with teachers in your mini-school or school in math, reading, other academic, other non-academic subjects.* The extent of discussion about non-classroom activities was determined by asking the teachers "how often do you confer with other teachers in your mini-school or school about**

- o maintaining control in your classes
- o outside activities (field trips)
- o nonacademic school activities

Table 6 indicates the high degree of correlation for all items in the first question and for the last two items in the second question. The DISCUSS scale was constructed by adding together the normalized values of each item asking about the frequency of discussing educational issues. The same method was used to construct the CONFER Scale indicating the extent to which teachers report confering about outside activities.

(Insert Table 6 about here)

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* response options (1) seldom or never (2) less than once a month (3) once or twice a month (4) about once a week (5) several times a week (6) daily (7) several times a day

** response options (1) seldom or never (2) once a month (3) once or twice a month (4) several times a week (5) daily (6) several times a day

Classroom Organization Variables

Differentiation: Teachers were asked "When you break the class into groups, how often do you try to make the members of each group approximately similar in ability" in the teaching of math, reading, other academic and nonacademic subjects.*

As the frequencies and correlations in Tables 7 and 8 indicate a moderate percentage of teachers group children according to ability in reading and math whereas more than half seldom ability group in other subjects. Two normalized scales were constructed summing scores for reading and math into the academic grouping scale and scores for other academic and nonacademic subjects into the nonacademic grouping scales. The creation of two distinct scales here and below is due to the belief that teachers have different values about academic and nonacademic subjects and that this differential valuation will probably lead to differences in how they organize to teach basic skills and such subjects as social studies and art.

(Insert Table 7 and 8 about here)

Routinization: Teachers were asked: "When the class is broken into groups, how often would you say the membership of groups change?" in math, reading, other academic and nonacademic subjects.**

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* response alternatives (1) seldom to never (2) occasionally (3) fair ly often (4) usually (5) always

** response alternatives (1) less than once a month (2) once or twice a month (3) about once a week (4) several times a week (5) daily (6) several times a day

Whereas almost sixty percent (or more in the case of reading) of the teachers seldom change a student's membership in a group for the academic subjects, most do for nonacademic subjects (see Table 9). Again two normalized scales were constructed to represent the frequency of group change in academic and non-academic subjects respectively (See Table10).

(Insert Tables 9 and10 about here)

Evaluation: To determine the frequency of evaluation in classrooms, teachers were asked "How often are tests administered in each of the following subjects (exclusive of standardized district-administered tests; eg., MAT, CTBS, etc.): math, reading, other academic subjects, other non-academic subjects*. It is evident that weekly or daily tests are common in the academic subjects and almost nonexistent in non-academic subjects. (see Table 11). Because of the different patterns in the academic and non-academic subjects two normalized scales were constructed: TEST ACADEMIC; TEST NONACADEMIC (see Table 12).

* response options (1) two or more times a year (2) once a month (3) about once a week (4) more than once a week (5) daily (6) several times a day

Perception of Classroom Environment

Students were administered a Classroom Environment Inventory containing the following scales*

- o Class is easy
- o affiliation
- o class is organized
- o low friction
- o low competition
- o teacher likes student
- o self esteem

Individual student scores were aggregated within classroom and the median score was assigned to the teacher. The correlations in Table 13 indicate that several of the scales are positively associated with each other. This makes sense in that there is bound to be less friction in a well run classroom. Similarly if students don't feel competitive they are likely to report little friction among themselves and a large amount of affiliation with their class. The results seem to indicate then a general sense of well being about ones class and a general sense of well being about oneself that is independent of feeling good about one's classroom. This notion is supported by the results of a principal component analysis (see Table 14) in which all the scales except school is easy and high self esteem load on Factor 1 and school is easy, class is organized and high self esteem load on Factor 2. Factor 1 seems to represent students reports of feeling good about their class whereas Factor 2 represents students feeling good about themselves.

* Items adopted from the following series: S. Coopersmith, "Self Esteem Inventory"; P.M. Insel and R.A. Moos, Classroom Environment Scale, Copyright 1974 by Consulting Psychologists Press, Palo Alto, Ca. 94306; G.J. Anderson and H.J. Walberg, "My Class Inventory". See Appendix A for items in each scale.

RESULTS

The exogenous variables under investigation turn out to be significantly correlated with each measure of teacher task interdependence (see Table 15). The smaller the school the greater is the likelihood that teachers will joint teach both academic and nonacademic subjects and will cross-grade. Also teachers involved in these complex arrangements report that their principals are quite supportive of innovative undertakings. Although belief in classroom orderliness was negatively correlated with all measures of teacher task interdependence, it was only significantly related to the joint teaching of non academic subjects. Thus the less concerned teachers are with maintaining formal order the more likely they are to engage in these more complex work arrangements.

The correlations in Table 15 also indicate that all measures of teacher task structure are strongly and significantly associated with teacher interaction on educational activities. Although all correlations of task structure with conferring about non academic subjects are in the expected direction, only the joint teaching of non academic subjects is significantly related to teacher task structure.

The exogenous variables also are related to the teacher interaction variables. Teachers report that those who frequently discuss educational issues and confer about classroom activities are in smaller schools, report their principal supportive and are low on the measure of attitudes about classroom order.

Both the teacher task structure variables and the teacher interaction variables are correlated with measures of classroom organization, the strongest of which are the joint teaching of both academic and non-academic subjects and discussing educational issues. It appears as if the more complex

measure of teacher task structure has a stronger association with most of the classroom organization variables than does crossgrading.

Although the correlations verge on the boundary of significance teachers who jointteach report ability grouping their students less, whereas the use of ability grouping is maintained by teachers who cross grade. Not only is there greater differentiation of students in classrooms where the task structure is more complex there also appears to be less routinization, since group membership change is positively associated with joint teaching. The same only holds true for cross grading when teachers report changing student group membership frequently in nonacademic subjects. The frequent use of testing is also associated with the more complex type of task structure although the correlations between cross grading are in the proper direction.

In order to determine how this set of variables are independently related to the dependent variables, a path analysis was employed. Table 16 lists the variables, the significant (at $p \leq .05$) standardized B coefficients and the residuals. Figure 1 illustrates the total model.

The strongest predictor of teacher task structure is school size. This implies that complex modes of teacher task structure are common in smaller schools (i.e., mini-schools). The lack of an affect of size on the joint teaching of academic subjects may be due to the fact that it is an infrequent occurance regardless of school size. Where size becomes an important factor then is that it fosters an environment where teachers work together more frequently on other than academic subjects. Cross grading also occurs more frequently in smaller schools as do teacher reports of supportive principals.

An examination of both Table 16 and Figure 1 also indicates that task structure is an important determinate of teacher interaction regardless of its complexity. Likewise the most significant predictor of conferring about non academic activities is the joint teaching of non academic subjects. It appears as if unless teachers are actively involved in the preparation and presentation of nonacademic subjects they will have little inclination to discuss such activities among themselves.

Although the direct effect of program size is non existent, it has an indirect effect through joint teaching of academic subjects on confering (-.14) and through cross-grading on discussing (-.05). These results suggest that greater interaction occurs among teachers involved in complex work arrangements regardless of their school's size. Small programs, however, are much more likely to promote this type of complex teacher arrangement which in turn effects teacher interaction.

None of the variables under investigation strongly predict the frequency with which teachers report ability grouping students, although the standardized coefficients between both joint teaching (-.14) and crossgrading (15) and grouping students by ability in academic subjects were in the predicted direction.

Teacher task structure has a different effect depending on whether group membership in academic or nonacademic subjects is examined: when teachers teach academic subjects jointly they frequently change the membership of student groups in reading and math classes, whereas a similar effect is absent where nonacademic subjects are concerned. Thus the more complex task structure seems to result in a less routinized classroom only when academic subjects are being taught.

The effect, however, of teacher attitudes about order in the classroom is similar for both measures of routinization. Regardless of whether one is looking at academic or nonacademic subjects, those teachers who run less routinized classroom share attitudes about classroom management. They seem to prefer classrooms in which students need not always work at their seats or depend solely on the teacher for direction. Thus classroom routinization depends in part on both teacher task structure and on teacher philosophy.

Two other variables have a significant effect on frequency of group membership change: the more teachers discuss academic subjects the more they report changing student membership in nonacademic activities; and the more teachers confer about outside activities the more frequently student membership in groups act up for the teaching of reading and math changes.

Evaluation. The path analysis indicates that teacher task structure has the strongest independent effect on the frequency with which students are tested in both academic and nonacademic subjects It appears that the effect of teacher task structure depends in large part on the subject area in which teachers team. Those teachers teaming in academic subjects evaluate students frequently on academic subjects; likewise for teachers teaming in nonacademic subjects.

Although none of the exogenous variables significantly predict the classroom organization variables, there is a small indirect effect of size (-.06) on the frequency of evaluation in nonacademic areas through the joint teaching of these subjects.

Subsample Results: Student Perceptions of Classroom Environment

The subsample of seventy-six teachers on whom student affective data was available was submitted to the same analysis as the larger sample. As the results of the path analysis indicate in Table 17, significant relationships exist between the exogenous and task structure variables, between the task structure and interaction variables, and between the three prior sets of independent variables and the classroom organization variables, similar to, although not an exact replication of, the results from the analysis of the large sample.[1]

Since this section represents an exploratory foray into the unknown, and only a subsample was available to explore the linkages under investigation, the discussion focuses on the predictors of student perceptions of their classroom environment rather than on the causal paths through which they occur.

The most consistantly occuring relationships seem to exist between the exogenous variables and student preceptions of their classroom. Where teachers report having supportive principals, students report feeling good both about their classroom and themselves. The smaller the school, the

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[1] The values circled in Table 17 were found to be significant in the analysis of the large sample. Given that the smaller the sample, the larger the F ratio needed to indicate significance, an arbritary decision was made to report standardized coefficients only if they were greater than .15, even if the F ratio was not large enough to be statistically significant.

less friction students report and the more they report liking their class and being liked back by their teacher. Teacher attitudes are another significant factor in student reports about classroom environment. The stronger the teachers' belief in an orderly classroom, the less easy the class appears to students; but the more affiliation and the less friction students experience. In sum students feel positively about their class when they are in a small school, have a teacher who runs a tight ship, and a principal actively involved in the educational enterprise.

The effect of task structure on student reports about their class is not pervasive. Teacher exchange of students for the purpose of instruction is associated with student reports of an easy class, some friction, and a negative overall assessment of their class, although a positive assessment of themselves. Also the more teachers report joint teaching, the less well students feel about themselves. It might well be that complex work arrangements among teachers are so poorly perceived by students because they differ from more familiar management techniques.

The interaction variables are also only associated with a couple of the affective measures: teachers who discuss nonacademic activities have students who claim their classroom is organized and that they feel good about themselves; teachers who discuss academic activities get high marks for running a good class by their students.

The only classroom organization variable having a pervasive effect on student reports was the variable measuring the frequency with which student membership in groups change. The more this occurs (i.e. the more non routine the classroom) in the teaching of nonacademic subjects, the more positively students feel about their class, since they report high affiliation, low competition and good organization. On the other hand when group membership change occurs frequently in academic classes, students don't feel so well about themselves.

Interesting enough, the frequency of evaluation seems to be an important predictor of student reports of a good class: the more often it occurs, the better ranked the class.

Discussion

The voucher demonstration has provided an "experiment" in which the effect of different sized educational programs on teacher task structure, interaction, classroom organization and kid perceptions of their environment can be investigated.

Whereas prior research has found that interaction among colleagues is more prevalent in smaller work groups, this study suggests that interaction is more a function of task structure than of work unit size. In Alum Rock for example, teachers participate in more complex work arrangements amongst themselves and its the complexity of these arrangements which necessitate and result in greater interaction.

The complexity of the task structure also seems to affect how teachers organize their classroom. When teachers engage in joint teaching there is a greater tendency for them to run a less routinized classroom and to evaluate students more frequently. However crossgrading, the less complex task arrangement had no significant effect on how teachers run their classes. This appears somewhat odd since in both types of work arrangements teachers report discussing educational issues frequently with each other.

Proceeding farther down the causal chain requires bold leaps of faith, difficult to muster but mustered none the less. The results here suggest that young children are sensitive observers of their school and classroom environment. In general they enjoy their class more when they are part of a smaller educational program and when their teacher is quite definite about maintaining order in the classroom. Perhaps this allows them to feel part of a family type work setting in which the rules and boundaries are well defined. The sensitivity extends even to the level of faculty/ staff interaction, since students are more likely to

like their classroom and feel good about themselves if the principal is supportive of his staff and teachers work intimately with each other. Perhaps the voucher demonstration entails so much upheaval that students associate calm and order both within and without. Students also report positive feelings about their class when they have frequent feedback about their school work and are treated as individuals as opposed to being just classified on the basis of their ability.

In certain respects the findings support the notion suggested by Indik (1965) that group size only indirectly affects organizational characteristics. On one hand the presumed benefits of small work groups do not flow directly from the nature of their size but result from a chain of causation in which small groups foster a more complex task structure which in turn results in greater teacher interaction and greater differentiation and less student routinization. On the other hand when it comes to student perceptions of their class environment the smallness of their school program seems to exert a sufficiently strong influence by itself.

Given that these findings are so consistent with previous research on work groups allows one to place some faith in the generalizability of these findings beyond the confines of the voucher demonstration. Given the difficulties of replicating laboratory results in school settings, this is no mean accomplishment.

The findings however are still both limited and tentative. This and past work has looked at how alteration of school unit size affects teachers, the way they organize themselves and their classes. It has also made a foray into acertaining how students feel about their school programs. We have found that size was directly and indirectly related to a number of seemingly desirable program characteristics. Topics left uninvestigated remain the effects of the organizational intervention on principals and the problems they might have with school management, and the effect of various program characteristics on student cognitive outcomes. Nevertheless the notion of influencing school outcomes by varying the size of the instructional unit has not yet lost its promise.

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Appendix A

Classroom Environment Inventory

Class is Easy

- o Students think class is easy.
- o School work is hard to do
- o Students often find the work hard in this class.
- o Only the smart students can do the work in this class.

Affiliation

- o Students in this class like each other.
- o Children in this class like each other as friends.
- o Students in this class are not friendly.

Class is Organized

- o Students are pretty quiet in this class.
- o Students fool around a lot in this class.
- o It's hard to work in this class because it's noisy.
- o This class is mixed up and confused.

Low Competition

- o Students often race to see who can finish first.
- o Students in this class try to do better than each other.
- o A few students in this class want to be first all of the time.
- o Students don't care who finishes the work first.

Low friction

- o Students in this class like to fight.
- o Certain students always want to have their own way.
- o Certain students don't like what other students do.

Teacher Likes

- o The teacher really likes the students in this class.
- o The teacher spends very little time just talking to students.
- o The teacher goes out of his/her way to help students.
- o The teacher is more like a friend than someone who tells you what you should do.

High-Self

- o I find it hard to talk in front of the class.
- o I'm proud of my school work
- o I like to be called on in class.
- o I often feel upset in school
- o I often get discouraged in school.

Table 1

Percent of Voucher and Nonvoucher Teachers in Grades 3-5 in the 76 Teacher Subsample

Grade	Voucher	Nonvoucher
3	.05 (3)	.04 (1)
4	.23 (12)	.16 (8)
5	.35 (18)	.44 (11)
3/4	.13 (7)	.16 (4)
3/4/5	.01 (1)	.00 (0)
4/5	.19 (10)	.04 (1)
N	(51)	(25)

Table 2

Principal Support	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Principal Support Scale
Release Time (1)								.69
Suggestions (2)	.44							.65
Special Programs (3)	.61	.46						.88
Relations with Parents (4)	.39	.40	.64					.79
Encourage Autonomy (5)	.36	.36	.58	.58				.74
Encourage Innovations (6)	.52	.43	.79	.64	.58			.85
Provide Leadership (7)	.47	.47	.69	.64	.59	.69		.84

Principal Support Scale

Inter-item Correlations

Table 3

Percent of Teachers Teaching in Small and Large Voucher and Nonvoucher Schools

School Size	School Type	
Numbers of Teachers	Voucher	Nonvoucher
Small (1-9)	78.3 (72)	0(0)
Large (10-35)	21.1 (20)	100 (47)
N	92	47

Table 4

Correlations of Joint Teaching in math, reading, other academic and nonacademic subjects

		1	2	3	4	Joint teach academic	Joint teach nonacademic
Joint teaching							
math	(1)		.49	.37	.25	.88	.35
reading	(2)			.52	.38	.85	.51
other academic	(3)				.52	.51	.87
other nonacademic	(4)					.36	.87
joint teach academic	(5)						.50

Table 5

Frequencies of Joint teaching in math, reading other academic and nonacademic subjects

	Math	Reading	Other academic	Other nonacademic
several times a day/ daily	4.2(6)	2.8(4)	4.2(6)	4.2(6)
several times a week	3.5(5)	2.1(3)	9.2(13)	15.6(22)
once a week				
once or twice a month or less	92.2(130)	95.0(134)	86.6(122)	80.1(113)
	(141)	(141)	(141)	(141)

Table 6

Correlations of Teacher Interaction Variables, The Discuss Index and Confer Scale

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	Discuss Scale	Confer Scale
Discuss Math	(1)		.87	.72	.60	.29	.18	.18	.92	.21
Discuss Reading	(2)			.66	.56	.29	.16	.13	.89	.17
Discuss other academic	(3)				.66	.16	.17	.28	.88	.26
Discuss nonacademic	(4)					.21	.16	.29	.81	.26
Confer about classroom control	(5)						.30	.27	.27	.33
Confer about outside activities	(6)							.43	.19	.87
Confer about nonacademic school activities	(7)								.26	.82
Discuss Scale										.26

Table 7

Frequency With Which Students are Ability Grouped in math, reading, other academic and nonacademic Subjects

	Math	Reading	Other Academic	Other Nonacademic
always/usually	51.7(73)	51.2(62)	11.2(14)	5.6(7)
often	34.8(49)	35.5(43)	16.8(21)	9.6(12)
Occasionally	7.1(10)	0.0 (1)	15.2(19)	5.6(7)
seldom/never	6.4(9)	12.4(15)	56.8(71)	79.2(99)
	141	121	125	125

Table 8

Correlations of Variables Measuring Ability Grouping by Academic Subject

Frequency of Ability Grouping	1	2	3	4	Academic Grouping Scale	Nonacademic Grouping Scale
Math (1)		42	37	.07	.69	.29
Reading (2)			.36	.10	.84	.26
Other Academic (3)				.34	.40	.62
Other Nonacademic (4)					00	.56
Academic Grouping Scale						.58

Table 9

Frequency with which group membership changes in math, reading, other academic and nonacademic subjects

	Math	Reading	Other academic	Other nonacademic
Daily +	16.2(19)	20.9(23)	9. (9)	21.7(18)
Several times a week	23.9(28)	10.0(11)	32.3(32)	51.8(43)
1-2 months or less	59.8(70)	78.1(86)	58.6(58)	26.5(22)
	117	110	99	83

Table 10

Correlations of Variables Measuring Group Membership Change by Academic Subject

Frequency of Group Membership Change in		(1)	(2)	(3)	(4)	Academic Membership Change Scale	Nonacademic Membership Change Scale
Math	(1)		.44	.41	.17	.75	.00
Reading	(2)			.48	.08	.73	.33
Other Academic	(3)				.72	.41	.46
Other nonacademic	(4)					.16	.86
Academic Membership Change							.45

Table 11

Frequency with which Students are tested
In Math, Reading, Other academic and Nonacademic subjects

	Math	Reading	Other Academic	Other nonacademic
daily/+	7.8(11)	12.0(17)	1.4(2)	2.8(4)
1/week +	72.3(102)	34 (49)	41.2(58)	10.0(14)
once or twice a month or less	19.8(28)	53.2(75)	67.5(81)	87.2(123)

Table 12

Corrolations of Variables Measuring Frequency of Testing
in math, reading, other academic and nonacademic subjects

Frequency of testing		(1)	(2)	(3)	(4)	Test Academic	Test Nonacademic
Math	(1)		.42	.37	.07	.69	.29
Reading	(2)			.36	.10	.84	.26
Other academic	(3)				.34	.40	.62
Other nonacademic	(4)					.00	.56
Test academic							.58

Table 13

Inter-item Correlations of Classroom Environment Scales, Classgood, and Me good Scales

	(1)	(2)	(3)	(4)	(5)	(6)	Class Good	Me Good
Class easy (1)							-.22	.75
Affiliation (2)	-.09						.70	.08
Class organized (3)	.15	.52					.84	.54
low friction (4)	-.17	.33	.34				.63	-.10
low competition (5)	-.07	.33	.38	.34			.57	.01
teacher likes me (6)	-.14	.36	.46	.36	.27		.67	-.03
high self esteem (7)	.50	.15	.55	.07	.12	.10	.25	.93
Class good (8)								.10

N = 76

Table 14

Factor Analysis of the Classroom Environment Scale

	Feel good about Class Factor	Feel good about Me Factor
Class easy	- 19	.65
affiliation	.62	.04
class organized	.75	.47
low friction	.56	-.09
low competition	.51	.02
teacher likes me	.60	-.03
high self esteem	.21	.82

Table 15

Correlation of Exogenous Structural, Interaction, and Classroom Organization Variables

	Exogenous Variables				Teacher Task Structure			Teacher Interaction		Classroom Organization Variables				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Voucher (1)														
Size (2)	.85													
Principal Support (3)	.01	-.07												
Teacher Order (4)	.24	.21	-.07											
JTAC (5)	-.04	.14	.10	-.04										
JTNAC (6)	-.23	-.31	.13	-.18	.50									
Crossgrading (7)	-.08	-.19	.30	-.04	.20	.24								
DISCUS (8)	-.02	-.15	.24	-.18	.32	.27	.33							
CONFER (9)	-.26	-.24	.05	-.14	.10	.39	.06	.26						
ABGRAC (10)	.03	.00	-.03	-.02	-.13	-.11	.11	.01	-.11					
ABGRNAC (11)	-.06	-.09	.01	-.08	.05	.00	.01	.02	-.03	.58				
GRCHAC (12)	-.12	-.09	-.07	-.28	.18	11	-.01	.13	.22	.03	.08			
GRCHNAC (13)	-.05	-.07	-.05	-.20	.12	.08	.14	.19	.12	.27	.15	.44		
TESTAL (14)	.02	-.07	.06	-.07	.31	.23	.09	.14	.09	-.06	.08	.08	.00	
TESTNAC (15)	.14	.09	-.06	.06	.15	.17	.07	-.09	.10	-.06	.17	.07	-.18	.42

N = 138; p .05 r = .14

Table 16

Path Analysis Results for the Effects of School and Teacher Task Structure
On Classroom Organization and Teacher Interaction

	Task Structure			Teacher Interaction		Classroom Organization Variables			
	JTAC	JTNAC	CG	DISCUS	CONFER	GRCHAC	GRRHNAC	TESTAC	TESTNAC
Size		-30	-18						
Principal Support			.30						
Teacher Order				-.16		-.26	-.19		
JTAC				.26		.16		.31	
JTNAC					.47				.19
Crossgrading (CG)				-.27					
DISCUSS							.16		
CONFER						.17			
residuals		.09	.13		.18	.15	.07	.10	.04

N = 136

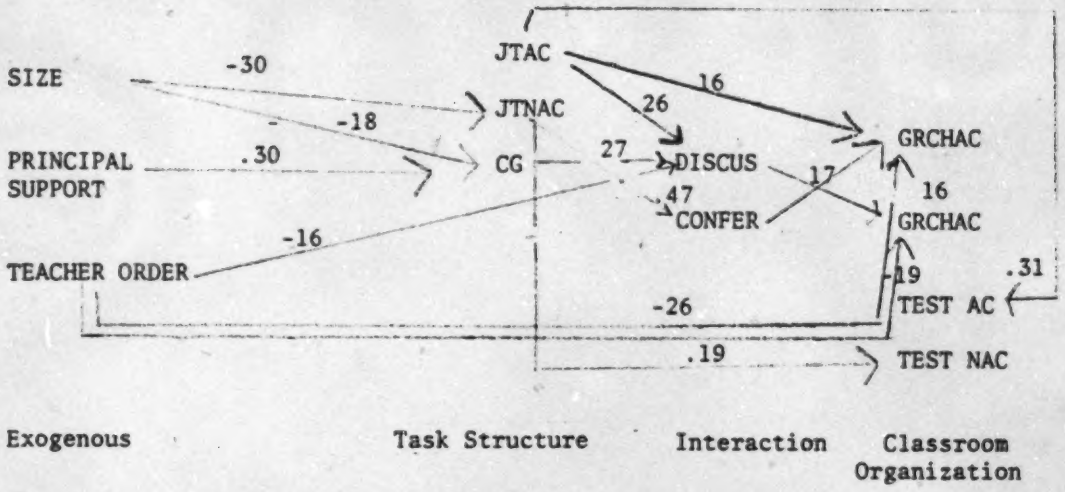

Figure 1 - A simple path model of the relationship between school and and task structure variables, teacher interaction and classroom organization.

Note: The path coefficients shown are each statistically significant (p .05) and the omitted paths are not. N=136 teachers

For those unfamiliar with path analysis, the arrows indicate presumed casual relationships between the variables and the path coefficients shown are simply standardized regression coefficients for ordinary least squares regression equations.

A concise presentation of the logic of path analysis can be found in Duncan (1975).

Table 17

Significant Standardized B Coefficients in Path Analysis Modeling Structure, Interaction and Classroom Organization on Student Perceptions of Their Classroom Environment*

	JTAC	JTNAC	Crossgrade	DISCUSS	CONFER	ABGRAC	ABGRNAC	GRCHAC	GRCHNAC	TESTAC	TESTNAC	Easy	Affiliation	Organized	Low Competition	Low Friction	Teacher Likes	His self	Class Good	Me Good
Size		(-39)	(-38)													-19	-22		-17	
Principal Support			(28)	28				+16	+18		19	18	21	.22				23	15	22
Teacher Order			28	+21)				(+24)	+31)			-17	28			16	17		32	
JTAC				(24)	-34					(30)	19									
JTNAC					(68)						34									-23
Cross Grading				( )		32			27	-15		21				-16			-26	23
DISCUSS									( )		-17						26		17	
CONFER								16						.24						23
ABGRAC															-16					-16
ABGRNAC																				19
GRCHAC																		-18		
GRCHNAC													23	.15	.21				25	
TESTAC																			19	
TESTNAC													18							
Residuals	.15	.27	.20	.10	.38	.10		.12	.14	.16	.19	.11	.15	.14	.06	.04	.12	.10	.19	.17

* Circled path coefficients were found to be significant in the analysis of the large teacher sample.

Table 18

Correlations of School and Classroom Structure, Variables and Teacher Interaction Variables with Student Affective Measures

	CLASS EASY	AFFILIATION	CLASS ORGANIZED	LOW FRICTION	LOW COMPETITION	Teacher Like Me	High Self	Class Good	Me Good
Principal Support	.23740	.17693	.21944	.00584	.04737	-.01071	.26058	.10745	.29086
Size	-.17705	.15436	-.10792	-.08574	-.14117	-.21580	.08433	-.07966	-.11252
Teacher Order	-.11870	.21477	.05002	.07796	-.11229	.03628	.12971	.08542	.04056
JTAC	.03476	.09391	.02302	.09233	-.05509	.09421	.05105	.05082	.02876
JTNAC	-.03285	-.09959	.11807	-.04732	.09015	.11586	-.02848	.08524	-.00408
Cross grading	.21631	.02920	.03418	.07351	.05905	.06080	.23121	.04449	.23435
CONFER	.03356	-.08253	.27205	-.10312	.06214	.24601	.09002	.16691	.12819
DISCUSS	.01704	.07443	.16579	.03594	.11044	.26311	.05650	.17998	.04556
ABGRAC	.00356	.02209	.04694	.00785	.11705	.01543	.02730	.01706	.03071
ABGRNAC	.03649	-.05657	-.02801	-.08785	.18927	-.02920	-.21154	-.01049	-.12861
GRCHAC	.06106	-.04972	.13489	.03319	.06219	-.07767	.09754	.05396	.12159
GRCHNAC	-.01865	.10176	.15852	-.05276	.17706	.14509	.03899	.15654	.03652
TESTAC	-.02767	.13962	.09724	.18956	.18605	.08386	-.12429	.18585	-.11280
TESTNAC	.00841	.14209	-.02745	.08153	.13859	.02716	-.10204	.06228	-.09841

N = 78